

SEQUENCE LISTING

<110> Wei et al.

<120> Human DNA Topoisomerase 1 Alpha

<130> PF118D3

<140> Unassigned

<141> 2001-06-04

<150> 09/325,430

<151> 1999-06-04

<150> 09/033,153

<151> 1998-03-02

<150> 08/458,477

<151> 1995-06-02

<150> PCT/US94/05701

<151> 1994-05-18

<160> 5

<170> PatentIn Ver. 2.1

<210> 1

<211> 1917

<212> DNA

<213> Homo sapiens

<400> 1

```
gcagatgcgc gtggtgcggc tgctgcggct cggggcggct ctgacgctgc tgggggaggt 60
ccccgcgcgc cgggcctccc ggggtgtccc gggctcgcgc aggacgcaga agggcagtgg 120
agccaggtgg gagaaggaga agcacgaaga cggggtgaag tggagacagc tggagcacia 180
gggcccgtag ttgcaccccc catacgagcc ccttcccagc ggagtgcgtt tcttctatga 240
aggaaggcct gtgagattga gcgtgccagc ggaggagggt cccacttttt atgggaggat 300
gttagatcat gaatacacia caaaggagggt tttccggaag aacttcttca atgactggcg 360
aaaggaaatg gcggtggaag agagggaagt catcaagagc ctggacaagt gtgacttcac 420
ggagatccac agatactttg tggacaaggc cgcagcccgc aaagtctga gcaggaggga 480
gaagcagaag ctaaaagaag aggcagaaaa acttcagcaa gagttcggct actgtatttt 540
agatggtcac caagaaaaaa taggcaactt caagattgag ccgcctggct tgttccgtgg 600
ccgtggcgac catcccaaga tggggatgct gaagagaagg atcacgccag aggatgtggt 660
tatcaactgc agcagggact cgaagatccc cgagccgcgc gcggggcacc agtggaagga 720
ggtgcgctcc gataacaccg tcacgtggct ggcagcttgg accgagagcg ttcagaactc 780
catcaagtac atcatgctga acccttgctc gaagctgaag ggggagacag cttggcagaa 840
gtttgaaaca gctcgacgcc tgcggggatt tgtggacgag atccgctccc agtaccgggc 900
tgactggaag tctcgggaaa tgaagacgag acagcgggcg gtggccctgt atttcacga 960
taagctggca ctgagagcag gaaatgagaa ggaggacggt gaggcggccg acaccgtggg 1020
ctgctgttcc ctccgcgtgg agcacgtcca gctgcacccg gaggcgatg gttgccaaca 1080
cgtggtggaa tttgacttcc tggggaagga ctgcatccgc tactacaaca gagtgccggt 1140
ggagaagccg gtgtacaaga acttacagct ctttatggag aacaaggacc cccgggacga 1200
cctcttcgac aggttgacca cgaccagcct gaacaagcac ctccaggagc tgatggacgg 1260
```

```

gctgacggcc aaggtgttcc ggacctacaa cgctccatc actctgcagg agcagctgcg 1320
ggccctgacg cgcgccgagg acagcatagc agctaagatc ttatcctaca accgagccaa 1380
ccgagtcgtg gccattctct gcaaccatca gcgagcaacc cccagtacgt tcgagaagtc 1440
gatgcagaat ctccagacga agatccaggc aaagaaggag caggtggctg aggccagggc 1500
agagctgagg agggcgaggg ctgagcacaa agcccaaggg gatggcaagt ccaggagtgt 1560
cctggagaag aagaggcggc tcttgagaa gctgcaggag cagctggcgc agctgagtgt 1620
gcaggccacg gacaaggagg agaacaagca ggtggccctg ggcacgtcca agctcaacta 1680
cctggacccc aggatcagca ttgcctggtg caagcgggtc agggtgccag tggagaagat 1740
ctacagcaaa acacagcggg agaggttcgc ctgggctctc gccatggcag gagaagactt 1800
tgaattctaa cgacgagccg tgttgaaact tcttttgtat gtgtgtgtgt ttttttcaact 1860
attaaagcag tactggggaa ttttgtacaa taaaaaaaaa aaaaaaaaaa aaaaaaa 1917

```

```

<210> 2
<211> 601
<212> PRT
<213> Homo sapiens

```

```

<400> 2
Met Arg Val Val Arg Leu Leu Arg Leu Arg Ala Ala Leu Thr Leu Leu
  1              5              10              15

Gly Glu Val Pro Arg Arg Pro Ala Ser Arg Gly Val Pro Gly Ser Arg
      20              25              30

Arg Thr Gln Lys Gly Ser Gly Ala Arg Trp Glu Lys Glu Lys His Glu
      35              40              45

Asp Gly Val Lys Trp Arg Gln Leu Glu His Lys Gly Pro Tyr Phe Ala
      50              55              60

Pro Pro Tyr Glu Pro Leu Pro Asp Gly Val Arg Phe Phe Tyr Glu Gly
      65              70              75              80

Arg Pro Val Arg Leu Ser Val Pro Ala Glu Glu Val Pro Thr Phe Tyr
      85              90              95

Gly Arg Met Leu Asp His Glu Tyr Thr Thr Lys Glu Val Phe Arg Lys
      100              105              110

Asn Phe Phe Asn Asp Trp Arg Lys Glu Met Ala Val Glu Glu Arg Glu
      115              120              125

Val Ile Lys Ser Leu Asp Lys Cys Asp Phe Thr Glu Ile His Arg Tyr
      130              135              140

Phe Val Asp Lys Ala Ala Ala Arg Lys Val Leu Ser Arg Glu Glu Lys
      145              150              155              160

Gln Lys Leu Lys Glu Glu Ala Glu Lys Leu Gln Gln Glu Phe Gly Tyr
      165              170              175

Cys Ile Leu Asp Gly His Gln Glu Lys Ile Gly Asn Phe Lys Ile Glu
      180              185              190

```

Pro Pro Gly Leu Phe Arg Gly Arg Gly Asp His Pro Lys Met Gly Met
 195 200 205
 Leu Lys Arg Arg Ile Thr Pro Glu Asp Val Val Ile Asn Cys Ser Arg
 210 215 220
 Asp Ser Lys Ile Pro Glu Pro Pro Ala Gly His Gln Trp Lys Glu Val
 225 230 235 240
 Arg Ser Asp Asn Thr Val Thr Trp Leu Ala Ala Trp Thr Glu Ser Val
 245 250 255
 Gln Asn Ser Ile Lys Tyr Ile Met Leu Asn Pro Cys Ser Lys Leu Lys
 260 265 270
 Gly Glu Thr Ala Trp Gln Lys Phe Glu Thr Ala Arg Arg Leu Arg Gly
 275 280 285
 Phe Val Asp Glu Ile Arg Ser Gln Tyr Arg Ala Asp Trp Lys Ser Arg
 290 295 300
 Glu Met Lys Thr Arg Gln Arg Ala Val Ala Leu Tyr Phe Ile Asp Lys
 305 310 315 320
 Leu Ala Leu Arg Ala Gly Asn Glu Lys Glu Asp Gly Glu Ala Ala Asp
 325 330 335
 Thr Val Gly Cys Cys Ser Leu Arg Val Glu His Val Gln Leu His Pro
 340 345 350
 Glu Ala Asp Gly Cys Gln His Val Val Glu Phe Asp Phe Leu Gly Lys
 355 360 365
 Asp Cys Ile Arg Tyr Tyr Asn Arg Val Pro Val Glu Lys Pro Val Tyr
 370 375 380
 Lys Asn Leu Gln Leu Phe Met Glu Asn Lys Asp Pro Arg Asp Asp Leu
 385 390 395 400
 Phe Asp Arg Leu Thr Thr Thr Ser Leu Asn Lys His Leu Gln Glu Leu
 405 410 415
 Met Asp Gly Leu Thr Ala Lys Val Phe Arg Thr Tyr Asn Ala Ser Ile
 420 425 430
 Thr Leu Gln Glu Gln Leu Arg Ala Leu Thr Arg Ala Glu Asp Ser Ile
 435 440 445
 Ala Ala Lys Ile Leu Ser Tyr Asn Arg Ala Asn Arg Val Val Ala Ile
 450 455 460
 Leu Cys Asn His Gln Arg Ala Thr Pro Ser Thr Phe Glu Lys Ser Met
 465 470 475 480

Gln Asn Leu Gln Thr Lys Ile Gln Ala Lys Lys Glu Gln Val Ala Glu
 485 490 495
 Ala Arg Ala Glu Leu Arg Arg Ala Arg Ala Glu His Lys Ala Gln Gly
 500 505 510
 Asp Gly Lys Ser Arg Ser Val Leu Glu Lys Lys Arg Arg Leu Leu Glu
 515 520 525
 Lys Leu Gln Glu Gln Leu Ala Gln Leu Ser Val Gln Ala Thr Asp Lys
 530 535 540
 Glu Glu Asn Lys Gln Val Ala Leu Gly Thr Ser Lys Leu Asn Tyr Leu
 545 550 555 560
 Asp Pro Arg Ile Ser Ile Ala Trp Cys Lys Arg Phe Arg Val Pro Val
 565 570 575
 Glu Lys Ile Tyr Ser Lys Thr Gln Arg Glu Arg Phe Ala Trp Ala Leu
 580 585 590
 Ala Met Ala Gly Glu Asp Phe Glu Phe
 595 600

<210> 3
 <211> 23
 <212> DNA
 <213> Homo sapiens

<400> 3
 cgggatccat gcgcgtggtg cgg

23

<210> 4
 <211> 57
 <212> DNA
 <213> Homo sapiens

<400> 4
 cgctctagat caagcgtagt ctgggacgtc gtatgggtag aattcaaagt cttctcc

57

<210> 5
 <211> 633
 <212> PRT
 <213> Homo sapiens

<400> 5
 Ile Lys Pro Leu Lys Arg Pro Arg Asp Glu Asp Asp Val Asp Tyr Lys
 1 5 10 15

Pro Lys Lys Ile Lys Thr Glu Asp Thr Lys Lys Glu Lys Lys Arg Lys

20 25 30
 Leu Glu Glu Glu Glu Asp Gly Lys Leu Lys Lys Pro Lys Asn Lys Asp
 35 40 45
 Lys Asp Lys Lys Val Pro Glu Pro Asp Asn Lys Lys Lys Lys Pro Lys
 50 55 60
 Lys Glu Glu Glu Gln Lys Trp Lys Trp Trp Glu Glu Glu Arg Tyr Pro
 65 70 75 80
 Glu Gly Ile Lys Trp Lys Phe Leu Glu His Lys Gly Pro Val Phe Ala
 85 90 95
 Pro Pro Tyr Glu Pro Leu Pro Glu Asn Val Lys Phe Tyr Tyr Asp Gly
 100 105 110
 Lys Val Met Lys Leu Ser Pro Lys Ala Glu Glu Val Ala Thr Phe Phe
 115 120 125
 Ala Lys Met Leu Asp His Glu Tyr Thr Thr Lys Glu Ile Phe Arg Lys
 130 135 140
 Asn Phe Phe Lys Asp Trp Arg Lys Glu Met Thr Asn Glu Glu Lys Asn
 145 150 155 160
 Ile Ile Thr Asn Leu Ser Lys Cys Asp Phe Thr Gln Met Ser Gln Tyr
 165 170 175
 Phe Lys Ala Gln Thr Glu Ala Arg Lys Gln Met Ser Lys Glu Glu Lys
 180 185 190
 Leu Lys Ile Lys Glu Glu Asn Glu Lys Leu Leu Lys Glu Tyr Gly Phe
 195 200 205
 Cys Ile Met Asp Asn His Lys Glu Arg Ile Ala Asn Phe Lys Ile Glu
 210 215 220
 Pro Pro Gly Leu Phe Arg Gly Arg Gly Asn His Pro Lys Met Gly Met
 225 230 235 240
 Leu Lys Arg Arg Ile Met Pro Glu Asp Ile Ile Ile Asn Cys Ser Lys
 245 250 255
 Asp Ala Lys Val Pro Ser Pro Pro Pro Gly His Lys Trp Lys Glu Val
 260 265 270
 Arg His Asp Asn Lys Val Thr Trp Leu Val Ser Trp Thr Glu Asn Ile
 275 280 285
 Gln Gly Ser Ile Lys Tyr Ile Met Leu Asn Pro Ser Ser Arg Ile Lys
 290 295 300
 Gly Glu Lys Asp Trp Gln Lys Tyr Glu Thr Ala Arg Arg Leu Lys Lys

305		310		315		320
Cys Val Asp Lys	Ile Arg Asn Gln Tyr	Arg Glu Asp Trp Lys Ser Lys				
	325		330		335	
Glu Met Lys Val	Arg Gln Arg Ala Val	Ala Leu Tyr Phe Ile Asp Lys				
	340		345		350	
Leu Ala Leu Arg	Ala Gly Asn Glu Lys Glu Glu Gly	Glu Thr Ala Asp				
	355		360		365	
Thr Val Gly Cys Cys Ser	Leu Arg Val Glu His Ile Asn Leu His Pro					
	370		375		380	
Glu Leu Asp Gly Gln Glu Tyr Val Val	Glu Phe Asp Phe Leu Gly Lys					
	385		390		395	400
Asp Ser Ile Arg Tyr Tyr Asn Lys Val	Pro Val Glu Lys Arg Val Phe					
	405		410		415	
Lys Asn Leu Gln Leu Phe Met Glu Asn Lys Gln Pro Glu Asp Asp Leu						
	420		425		430	
Phe Asp Arg Leu Asn Thr Gly Ile Leu Asn Lys His Leu Gln Asp Leu						
	435		440		445	
Met Glu Gly Leu Thr Ala Lys Val Phe Arg Thr Tyr Asn Ala Ser Ile						
	450		455		460	
Thr Leu Gln Gln Gln Leu Lys Glu Leu Thr Ala Pro Asp Glu Asn Ile						
	465		470		475	480
Pro Ala Lys Ile Leu Ser Tyr Asn Arg Ala Asn Arg Ala Val Ala Ile						
	485		490		495	
Leu Cys Asn His Gln Arg Ala Pro Pro Lys Thr Phe Glu Lys Ser Met						
	500		505		510	
Met Asn Leu Gln Thr Lys Ile Asp Ala Lys Lys Glu Gln Leu Ala Asp						
	515		520		525	
Ala Arg Arg Asp Leu Lys Ser Ala Lys Ala Asp Ala Lys Val Met Lys						
	530		535		540	
Asp Ala Lys Thr Lys Lys Val Val Glu Ser Lys Lys Lys Ala Val Gln						
	545		550		555	560
Arg Leu Glu Glu Gln Leu Met Lys Leu Glu Val Gln Ala Thr Asp Arg						
	565		570		575	
Glu Glu Asn Lys Gln Ile Ala Leu Gly Thr Ser Lys Leu Asn Tyr Leu						
	580		585		590	
Asp Pro Arg Ile Thr Val Ala Trp Cys Lys Lys Trp Gly Val Pro Ile						

595

600

605

Glu Lys Ile Tyr Asn Lys Thr Gln Arg Glu Lys Phe Ala Trp Ala Ile
610 615 620

Asp Met Ala Asp Glu Asp Tyr Glu Phe
625 630